

Chapter 2

Initiatives in Fiscal Year 2002

In FY02, DON continued to make progress in its environmental restoration efforts, with the development of a site inventory for the recently established Munitions Reponse Program (MRP), and in developing policies to assist in guiding the cleanup processes. All these policies can be found at the websites provided within this section, or on the DON environmental restoration website at <http://5yrplan.nfesc.navy.mil/>.



Homepage of the Environmental Restoration website.

New Policies

Sediment

In response to concerns expressed by personnel in the field regarding the investigation and remediation of contaminated sediment, CNO developed the Sediment Investigation and Response Action policy. The majority of DON installations are along shorelines, and therefore, sediment is a concern. Some of the sediment issues of concern include: the complexity of assessing and managing contaminated sediment sites; potential economic ramifications; and lack of consistency and data quality in sediment investigations.

CNO developed the Sediment Investigation and Response Action Policy to address concerns from the field concerning sediment issues.



http://enviro.nfesc.navy.mil/erb/erb_a/regs_and_policy/don_policy_sediment.pdf

The new sediment policy specifies the following:

1. The source must be identified and controlled before cleanup procedures are implemented;
2. The remediation must be risk-based and have site-specific cleanup goals; and
3. The monitoring criteria for any monitoring plan must be established before the first sample is collected.

All investigations and response actions must be directly linked to DON CERCLA/RCRA contaminant releases (BRAC or ER, N eligible; connected to a DON IRP or BRAC site). The project team, consisting of the Remedial Project Managers (RPMs), Remedial Technical Managers (RTMs), regulator, and contractors, should discuss the desired outcome of each of the IRP phases. Extreme care must go into the design and planning of any investigation and response action.

DON sites most impacted by the sediment policy are source areas that range from complex sites with numerous hazardous substances to simple sites with minor petroleum releases. Many major DON installations such as Norfolk, San Diego, Pearl Harbor, and Bangor are located in areas protected from strong wave and ocean currents. The relative weak water circulation of these areas promotes sediment deposition and accumulation. Diverse contaminants can accumulate in sediment. The accumulation of sediment and associated constituents is a function of many factors including its source (e.g., riverine input, urban runoff, industrial discharges, sewage), type of constituents (e.g., pesticides, hydrocarbons, heavy metals), grain size (e.g., sand, silt, clay), and water transport mechanisms and depth. Through time, the concentration of constituents in sediment can increase to orders of magnitude higher than that of the overlaying water column, causing contamination that may need to be remediated.

Natural Resource Injury

DON places a high priority on protecting natural resources under Navy management and control. The Natural Resource Injury (NRI) policy provides clarification on investigating the impact to natural resources and gives direction on implementing response actions within the DON Installation Restoration Program. The NRI policy stresses the use of risk assessments to evaluate NRIs, involving Natural Resource Trustees (NRTs) in the process, selecting remedies that address the injuries to the natural resource, and spending ER, N and BRAC funds only on restorations and not on items not related to natural resources. This policy explains the procedures and actions that apply to site investigations and restorations funded with ER, N and BRAC funds. The policy also refers to Natural Resource Damage Assessment (NRDA) against non-Navy parties that have caused injury to our natural resources.

Our policies and guidance documents are tools that help DON RPMs and technical managers effectively implement SMART cleanups.

Guidance

To assist Remedial Project Managers (RPMs) with performing restoration projects, several technical guidance documents have been created for individual technical areas. The following paragraphs summarize each of these important documents:

Guidance for Environmental Background Analysis, Volume 1: Soil was completed in FY02. This guidance supports the CNO Interim Final Policy on the Use of Background Chemical Levels by providing detailed instructions for evaluating background chemicals in soil.

http://enviro.nfesc.navy.mil/erb/erb_a/restoration/methodologies/bg_soil_guide.pdf



DON Ecological Risk Assessment (ERA) Web Site provides guidance for implementing the CNO ERA policy. It identifies a three-tiered process for estimating ecological risks and evaluating the effectiveness and potential impacts of remedial alternatives.

<http://web.ead.anl.gov/ecorisk/>





http://enviro.nfesc.navy.mil/erb/erb_a/support/wrk_grp/raolrm/case_studies/Int_Final_Guide.pdf

The Guide to Optimal Groundwater Monitoring concentrates on the most significant ways to design and optimize groundwater-monitoring programs. This will maximize cost effectiveness without compromising the program or the data quality.



<http://www-nehc.med.navy.mil/HHRA/index.htm>

Navy Guidance for Conducting Human Health Risk Assessments Web Site provides guidance for conducting human health risk assessments with the primary target audience being DON RPMs, and the issues that RPMs must address in order to carry out their responsibilities.

Workgroups



http://enviro.nfesc.navy.mil/erb/support/work_grp/main.htm

DON works with many agencies and other stakeholders to develop policy and guidelines for the program. Participating in internal DON and interagency workgroups is an important component of CNO's function. The following workgroups have been active in developing policy and procedures for the Installation Restoration Program:



http://enviro.nfesc.navy.mil/erb/support/work_grp/artt/main.htm

Alternative Restoration Technology Team (ARTT) is chaired by Naval Facilities Engineering Service Center (NFESC) and is comprised of representatives from CNO, Marine Corps, NFESC, and NAVFAC Engineering Field Divisions and Activities (EFD/As). ARTT promotes the use of innovative technologies to save time and money.



http://enviro.nfesc.navy.mil/erb/support/work_grp/risk_assess/main.htm

Risk Assessment Workgroup (RAW) acts as an advisory group to DON RPMs. It facilitates the application of risk assessment policies at DON IRP sites, and works to achieve protection of human health and the environment. Focus areas include: chemical background levels, ecological, human health, sediments, and risk-related monitoring.

- **Sediment Subgroup** provides written guidelines on when and how an RPM and project team might approach complicated sediment investigations.
- **Ecological Monitoring Subgroup** is a combined effort of the Environmental Protection Agency (EPA) and DON's Environmental Restoration Team (ERT) to develop a protocol for monitoring sites that were driven by ecological risk, or require that the habitat be monitored for residual effects.
- **Natural Resource Injury (NRI) Subgroup** assists in the interpretation and execution of the DoD policy on NRI in CERCLA.

The RAW is currently working on the following guidance documents:

- Guidance for Environmental Background Analysis, Volume 2: Sediment.
- Implementation Guide for Assessing and Managing Contaminated Sediment at Navy Sites.
- Natural Resource Injury Guidance.

The RAW is working with the U.S. EPA to develop the EPA Guidance for Monitoring at Hazardous Waste Sites: Framework for Monitoring Plan Development and Implementation.

The RAW has been identified by NAVFAC as a Functional Work Group (FWG) and is working to support the identification of Risk Assessment Y0817 needs, and to provide an interface between the Research and Development (R&D) community and DON users. As a part of this effort, the RAW is looking at ways to work with the R&D community to improve risk assessment technology transfer efforts.

The RAW continues to coordinate efforts and support other workgroups. This includes coordinating with ARTT on the technology transfer efforts, and review of Risk Assessment Software for the Geographic Information System (GIS) Workgroup.



http://enviro.nfesc.navy.mil/erb/support/work_grp/raoltm/main.htm

Remedial Action Operation/Long Term Management (RAO/LTM) Optimization Workgroup was created to identify and address issues encountered by RPMs. The workgroup develops guidance documents for RPMs and their contractors to optimize activities associated with RAO/LTM. The workgroup has developed two documents: Guidance for Optimizing Remedial Action Operations; and Guide to Optimal Groundwater Monitoring.



http://enviro.nfesc.navy.mil/erb/support/work_grp/arms/main.htm

Administrative Records Management System (ARMS) Workgroup investigates, develops, and implements the automated administrative records management system for DON environmental field offices. The workgroup has developed an ARMS User Guide which is currently being updated. The ARMS workgroup is also working with the newly formed Geographic Information System (GIS) work group on integrating Administrative Records management.



http://enviro.nfesc.navy.mil/erb/support/work_grp/ctc/main.htm

Cost-to-Complete Workgroup promotes sound cost estimating practices within the Installation Restoration Program. The CTC workgroup ensures that the needs and perspectives of each field office are addressed throughout the development of consistent software applications for IRP site remedy selection during budget preparation and estimating. The workgroup has developed new cost models for new remedies and upgraded existing cost models to reflect current status.



<http://pacinfo.efdpac.navfac.navy.mil/uxo/frames.html>

Munitions Response Program (MRP) Workgroup was formed to deal with munitions response, and munitions and explosives of concern (MEC) issues due to the unique challenges posed.

Ecological Risk Technical Assistance Team (ERTAT) works to ensure that the DON conducts consistent, technically sound, and cost-effective ecological risk assessments for IRP sites.

<http://enviro.nfesc.navy.mil/erb/support/tat/era.htm>



The Interstate Technology and Regulatory Council (ITRC) is a state-led national coalition helping achieve better environmental protection through use of innovative technologies. ITRC helps reduce technical and regulatory barriers to deployment of new technologies. The Navy is a member of the ITRC board and participates in two technical ITRC workgroups: the Sediment workgroup and the Munitions Response Program workgroup.

<http://itreweb.org/common/default.asp>



Outreach

RABs

In FY02, DON continued its commitment to involving stakeholders in the Installation Restoration Program. Communities and other stakeholders are critical constituents of the restoration program, providing DON with insight on addressing cleanup issues at Navy and Marine Corps installations. DON has 91 Restoration Advisory Boards (RABs) at active and closing Navy and Marine Corps installations.

DON's commitment to involving stakeholders in its environmental restoration efforts has built trust and credibility through the years and has turned concerned citizens into motivated allies of the Installation Restoration Program. DON will continue to embrace stakeholder advice and contributions in resolving issues and improving the DON restoration efforts.

Technical Assistance for Public Participation

In FY02, DON continued to provide avenues for the community to learn more about the technical issues that the Installation Restoration Program is built around. The Technical Assistance for Public Participation (TAPP) program is one of those avenues. The TAPP program has been instrumental in educating communities. It also has provided community stakeholders with an understanding of the highly technical cleanup program. During FY02, the Restoration Advisory Boards and Technical Review Committees inquired about or requested eight TAPPs. TAPPs were approved and/or awarded at Naval Weapons Industrial Reserve Plant, Bethpage, NY; Naval Weapons Industrial Reserve Plant, Calverton, NY; Hunters Point Shipyard, San Francisco, CA; Naval Weapons Station Seal Beach Detachment, Concord, CA; and Former U.S. Naval Ammunition Support Detachment, Vieques, Puerto Rico. The TAPPs were awarded for review and presentation of Environmental Restoration technical documents. The TAPPs that were not awarded in FY02 are planned for award in FY03.

Focus Areas

Munitions Response Program

The new Munitions Response Program will proactively address munitions and explosives of concern.

Congress mandated that DoD and the military components develop a program to address military munitions as part of the Defense Environmental Restoration Program (DERP). In FY02, DoD began developing a Military Munitions Response Program (MMRP) with three goals:

1. Reduce risk to people and the environment from the hazards associated with munitions and munitions constituents.
2. Conduct munitions responses to ensure land reuse by non-DoD parties.

3. Complete all Installation Restoration Program requirements associated with munitions constituents.

The DON's Munitions Response Program (MRP) is geared toward munitions removal and restoration at Navy and Marine Corps locations, other than operational ranges. This includes closed ranges and defense sites on active bases, closed ranges transferred under prior BRAC authorities, and Formerly Used Defense Sites (FUDS) impacted by military munitions and constituents resulting from past Department of Navy activities.

MRP Site Prioritization Protocol

DoD, in consultation with states, tribes, and the public, is developing a protocol for prioritizing its MRP sites. The DoD workgroup, in which DON has actively participated, expects to publish protocol in The Federal Register in the spring of 2003. Following the public comment period, the protocol will be finalized and applied to all identified sites. In addition to DON's participation in the DOD workgroup, DON's NAVFAC Munitions Response Program workgroup is currently testing the proposed protocol to determine whether it will work in the field. The NAVFAC workgroup is studying:

1. Explosive hazard assessment
2. Munitions constituents
3. Explosives safety concerns

Inventory

In the FY02 Defense Authorization Act (codified at 10 United States Code (USC) 2710), Congress mandated that DoD develop a complete inventory of defense sites impacted by unexploded ordnance, discarded munitions, and munitions constituents. Each of the DoD components has been working to complete this task. In FY02 DON worked on further developing its initial FY01 inventory. DON has identified

approximately 212 sites that may require further action. The FY02 inventory will serve as the baseline for DON's Munitions Response Program, and the basis for DON's cost-to-complete estimate. This inventory will be published annually in the DoD DERP Annual Report to Congress. The number of MRP sites is included in this Report for each installation in the Chapter 5 Installation Summaries. Appendices B and D present MRP site status in tables.

Workgroups and Policy

NAVFAC's MRP workgroup was convened to share information across the NAVFAC Engineering Field Divisions and Activities (EFD/As) relating to the Program. As the DON's experts in munitions response, they act as a sounding board for policy on munitions response and munitions and explosives of concern, and are currently testing the site prioritization protocol for viability in the field.

CNO is developing an oversight policy for explosives safety decisions within the Munitions Response Program. DON expects to finalize the policy in 2003.



<http://www.cecocos.navy.mil>

Training

The DON's Environmental and Natural Resources Training Program is a comprehensive training and awareness program for DON military and civilian personnel. This program has 43 environmental and natural resource courses. Qualified instructors from CECOS, and the Navy Occupational Safety and Health, and Environmental Training Center teach each of these specialized courses. Courses include such topics as Environmental Background Analysis, Ecological Risk Assessment, Human Health Risk Assessment, and Remedy Selection and Closure. These courses help keep DON Remedial Project Managers and other technical staff up-to-date on the latest trends and technologies, helping DON achieve its SMART clean up goals.

New Class: In FY02, CECOS added a Munitions Response Program (MRP) course to the class roster. This course is an introduction to the issues surrounding military munitions, including public and worker safety, the potential for soil/groundwater contamination, removal versus controlled detonation options, site characterization, and institutional controls.

Another source of training available to DON personnel is the Interstate Technology and Regulatory Council (ITRC). The ITRC has developed several web-based courses. ITRC is presented in more detail on page 2-7. To find more information, visit <http://www.itrcweb.org>.

The Remediation Innovative Technology Seminar (RITS) is another source of training for DON's environmental personnel. These seminars focus on getting information on the latest innovative technologies out to the field quickly. A collection of short seminars is put together twice a year and taken to the NAVFAC Engineering Field Divisions and Activities.

New seminar topics are selected based on input from DON's Remedial Project Managers and focus on the most recent challenges to the Installation Restoration Program, as well as new DoD policies and guidance. Each presentation is structured and formatted to provide background information, technical guidance, regulatory concerns, cost information, technology transfer tools, lessons learned, references, and points of contact.

While RITS seminars are developed primarily for the Navy's environmental restoration and BRAC environmental professionals, they are also available to other DoD personnel, the Navy environmental restoration contractors, and environmental regulators. Registration for the current series is available on the web at http://enviro.nfesc.navy.mil/erb/erb_a/support/rits/.

Frequent training helps keep our RPMs up-to-date with the most current information and technologies.

<http://www.itrcweb.org>



http://enviro.nfesc.navy.mil/erb/erb_a/support/rits/



Cost Avoidance

Each year DON receives a set amount of funding for its entire Installation Restoration Program. Conducting cost effective remedial actions results in greater funding availability for other DON projects. By partnering with regulators, communities, and other stakeholders to achieve buy-in for cleanup decisions and using innovative technologies, DON avoided several million dollars in cleanup costs in FY02. These cost avoidance measures are helping keep the Navy on schedule for completing site cleanup by 2014. Avoiding costs at sites undergoing remediation allows DON to offset the costs associated with new program requirements.

Several projects that achieved a significant cost avoidance are highlighted in the stories at the end of this chapter.

At Naval Surface Warfare Center Dahlgren, Virginia, a significant cost avoidance was realized by combining an IRP remediation project with a needed Public Works project (see page 2-15). Contaminated soil and sediment removal was combined under one contract with a new culvert installation to improve drainage in the same area, resulting in a cost avoidance. On this same project, reuse of existing equipment from another DoD facility and use of water resources on-site allowed further cost avoidance.

At the Naval Hospital and housing complex in Bremerton, Washington, the Navy found a way to conduct three separate remedial actions as an integrated project during the same timeframe for a cost-effective solution (see page 2-17). Using fill material from a Military Construction (MILCON) excavation for a landfill cover avoided the cost of importing clean soil and avoided disposal costs on the MILCON project. This project required extensive up-front planning which resulted in avoidance of rework costs.

Marine Corps Base Camp Pendleton, California, was able to achieve a significant cost avoidance by designating an IRP site a Corrective Action Management Unit (CAMU) and consolidate contaminated soil from other sites within the CAMU (see page 2-19). This avoided the cost of offsite disposal and future liability costs associated with the off-site disposal area.

Naval Air Station Cecil Field, Florida, used an innovative approach to optimize the remediation of sites with contaminated soil (see page 2-21). Using a risk assessment and statistical analysis of the site data, the amount of soil removal necessary to be protective of human health and the environment was very specifically determined. This resulted in a cost avoidance of unnecessary soil removal. Another source of cost avoidance came from making use of the internet, a simplified data reporting format, and a web-based document management system to expedite the reporting and reviewing cycle.

Naval Weapons Station Charleston, South Carolina, made use of some innovative technologies for site investigation that resulted in cost avoidance and selection of cost effective remedies (see page 2-23). The use of non-invasive seismic refraction to locate pools of dense contaminants in groundwater, tree coring to track contamination plume migration, and use of the Membrane Interface Probe (MIP) to conduct efficient groundwater sampling allowed for cost-effective, timely and more precise site investigation.

At Naval Weapons Industrial Reserve Plant Saint Louis, Missouri, a Government-Owned, Contractor-Operated facility, the cost of remediation was avoided by deducting it from the sale price of the facility (see page 2-25). With careful legal research and contractual requirements definition, the facility was sold to a government contractor



From The Field, Corrective Action Management Unit (CAMU) Avoids Cost, Reduces Liability, and Saves Time, page 2-19.



From The Field, Government-Owned, Contractor-Operated Facility Divested, page 2-25.

and the government's portion of the cleanup costs were avoided. This took cooperation among all involved including the regulatory agencies and the local community.



The 2002 Restoration Employees of the Year Award winners (from left to right): Mr. Antonio Tactay (EFA West), Mr. Robert A. Nash (NFESC), Mr. Nick Ugolini (Southern Division), Mr. Edward J. Boyle (EFA Northeast), Mr. Andrew D. Gutberlet (EFA Chesapeake), Mr. Jerry T. Dunaway (Southwest Division), and Mr. Timothy A. Reisch (Atlantic Division). Not pictured: Ms. Janice Fukamoto (Pacific Division) and Mr. James Brown (EFA Northwest).

Environmental Restoration Awards

To encourage outstanding performance in restoring natural resources and the protection and enhancement of human health and the environment, CNO grants Environmental Restoration awards each year. These top performers receive the DRUM-E award for their service to the Installation Restoration Program. The award recipients for FY02 are pictured here.

Conclusion

DON accomplishments this year continue to drive the Installation Restoration Program forward. New policies and guidance ensure that DON Remedial Project Managers and technical managers have the tools they need to efficiently manage remediation efforts. Exploring innovative technologies and techniques helps DON avoid costs, and thus offset the costs of new requirements. All of this is keeping DON on track for completing the Installation Restoration Program requirements by 2014.

The progress made in developing the Munitions Response Program will put DON in a good position to start estimating the cost to complete for this important program. The foundation laid in FY02 with the site protocol and inventory will help determine the future needs for this program.

• *From the Field* •

• INNOVATIVE APPROACH/PARTNERING •

Wetland Restored Via Up-Gradient Flooding Resolution

Naval Surface Warfare Center Dahlgren, Virginia

Project Summary

The Naval Surface Warfare Center in (NSWC) Dahlgren, VA is located 40 miles south of Washington, DC along the Potomac River, and conducts research, development, testing, and evaluation of surface ship weaponry. The facility was established in 1918 and covers approximately 4,300 acres. The Navy restored approximately 1.69 acres of emergent non-tidal wetlands, and created approximately 2.03 acres of emergent non-tidal wetlands, while also working with the public works department to improve a drainage system.

Soil and sediment covering a 2.8-acre area of Site 25 is contaminated with pesticides (DDT, DDD, DDE, Aldrin, Endrin, and Dieldrin) and metals (antimony, lead, mercury, and silver) due to the past practice of rinsing pesticide equipment. Historical data indicates that a former surface water inlet located in the vicinity of the present swale was filled during the late 1930s to early 1940s, and also indicates that buildings, roads, and yard areas around the site were being

constructed during that same time period.

In an effort to reduce the risk of harm to people, vegetation, and animals, the Navy evaluated a number of potential approaches to reducing contaminants to levels acceptable to State and Federal regulators. As required by the Navy's CERCLA obligations, the Project team, known as the Dahlgren Installation Restoration Team (DIRT), evaluated methods for reducing flooding in up-gradient buildings and expanding the wetlands previously filled in at the site. Flooding in basement buildings occurred during heavy rains and was largely caused by inadequate outflow from the cooling pond outlet. The cooling pond outlet drains under Site 25 via a concrete storm drainpipe that leads to Upper Machodoc Creek.

After evaluating a number of alternatives, the DIRT excavated the contaminated soil and sediment, increased the overall wetland area, and installed a large culvert with greater drainage capacity for the cooling pond. The Remedial Action Contract (RAC) contractor pre-

excavated the area to determine the exact location of the utilities prior to excavating the concrete formwork, to ensure that the utilities were not interrupted during the excavation. The DIRT coordinated with base Public Works to ensure cooling pond water levels remained constant in order to minimize foul odors and maintain the fish population.

The cooling pond drainage was directed into the remediated and expanded wetlands. This particular remedy did not result in any hazardous substances remaining onsite and no long-term operation and maintenance program was required, except for minor oversight of the wetland area. Since the wetland area is located in a low-lying area and receives cooling pond drainage waters, it is expected to re-establish more quickly than average newly created wetland areas.

The base was very supportive of cleaning up the site, improving drainage, expanding the wetlands, and closely evaluated the design drainage calculations. Dahlgren Base funds were added to the project for

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the culvert construction along with ER,N funding for remediation.

Public Works Involvement

The Navy held biannual RAB meetings to explain the proposed remedy and receive input from the community. A fact sheet was also distributed to the RAB members to provide additional information. The DIRT worked very closely with Dahlgren Public Works throughout the duration of the design and construction phase to ensure the project focus was maintained. The DIRT also worked closely with regulators to ensure that project cleanup goals were reasonable while still effective at protecting human health and ecological resources.

Construction Challenges

The RAC contractor had to carefully excavate the area and provide steel support to the utilities while excavating under them due to the presence of numerous utilities (electrical, fiber optic, telephone, water, etc.) around the drainage outlet. A portable dam had to be installed at the cooling pond to keep water from entering the excavation area. The portable dam proved to be very effective at stabilizing the cooling pond water levels and keeping the excavation area dry.

After the wetlands and grass were installed, drought conditions were experienced for a significant period of time, requiring a watering system to be installed to keep the plants at the appropriate moisture levels.

Cost Avoidance Measures

Combining an IRP requirement with a Public Works problem enabled both issues to be addressed under a single contract. Public Works avoided having to address the drainage problem at a later date, which could have potentially impacted the wetland restoration activities and tied up resources managing the project. Public Works was very supportive in funding the cost of the drainage structure and solving their drainage issues with minimal project planning and supervision. By expanding the existing wetland and improving drainage in the restoration area, the Navy avoided having to create additional wetlands on another part of the base, and increased the wetland's potential for success. Additionally, rain reels were donated from another DoD facility, and potable water was provided by the cooling pond, allowing for significant cost avoidances for these two critical equipment needs.

Lessons Learned

- Plan on watering vegetation if the restoration area experiences drought conditions. Dahlgren has experienced excessive drought conditions over the past few years that can stress newly planted vegetation. The RAC contractor set up rain reels to draw water from the cooling pond for watering upland and wetland vegetation.
- Pre-excavate utility locations to minimize unexpected conditions.
- Keep Public Works involved daily when uncovering both known and unknown utilities.
- Review confirmation sampling data with the regulators during the project to obtain buy-in throughout the various project phases.

• From the Field •

• COST AVOIDANCE •

Navy Performs Restoration at Housing Complex and Hospital

Bremerton, Washington

Project Summary

Engineering Field Activity, Northwest (EFA Northwest) was successful in transforming portions of the former Naval Ammunition Depot into a recreation area for the Jackson Park Housing Complex and Naval Hospital Bremerton. This was accomplished through three distinct actions:

- A Remedial Action (RA) as agreed to by a Record Of Decision (ROD);
- A Time Critical Removal Action (TCRA) related to ordnance clearance; and
- The creation of a recreation area.

The RA included construction of a shoreline protection system to prevent erosion and exposure of contaminated soil and landfill debris; installation of a one-foot thick vegetative soil cover to prevent direct contact with contaminated soils on portions of the project site; and removal of creosote-treated pilings in Ostrich Bay. In addition, the source of vinyl chloride seeps in a specific section of shoreline was investigated, and an area within the housing complex was investigated for presence of polycyclic aromatic

hydrocarbon (PAH) contamination. Based on the results of this investigation, soil from the PAH area was removed in June 2002.

The goal of the TCRA was to protect site workers and residents from the potential dangers associated with abandoned ordnance. The TCRA was completed prior to the construction of the one-foot thick vegetative soil cover, and included the removal of abandoned ordnance to a depth of one foot.

Following the Remedial Action and TCRA, recreation features were installed above the vegetative soil cover. EFA Northwest installed a bike path, playground, softball field, and tennis, basketball, and volleyball courts. The Remedial Action began after the signing of the ROD in August of 2000, and the project was completed in June of 2002.

Community Involvement

During the planning process, EFA Northwest took additional steps to



Aerial view before restoration.

address regulator and stakeholder comments, on the design and project plans, by holding bi-weekly design meetings. EFA Northwest also provided site overviews and answered questions during multiple site visits by stakeholders. To extend the construction season beyond the traditional fish passage, EFA Northwest coordinated site visits for the Washington Department of Fish and Wildlife (DFW). Because no surf smelt eggs were discovered by the DFW during these visits, the shoreline construction schedule was extended.

Additional and intense community involvement occurred during the ordnance clearance in the PAH soils excavation area. This activity required temporary relocation of twenty-four families and included

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Aerial view after restoration.

hotel accommodations and a meal allowance. EFA Northwest held a public meeting, sent out mailings, and conducted door-to-door discussions with residents to keep them informed of the activities and how they would be affected.

Construction Challenges

The potential presence of abandoned ordnance in close proximity to a residential area required extra safety precautions. EFA Northwest enclosed the area with fencing, posted security guards during non-working hours, and used reusable Ecology blocks as a blast shield around the dig area to protect residents. Additionally, during the



Installation of shoreline protection system.

PAH work, residents were temporarily relocated for their safety, and the work schedule was adapted to the elementary school schedule to minimize the impact on affected families.

Cost Avoidance Measures

One of the project requirements was to remove any existing ordnance from the top one-foot of soil at the site. The chosen approach was to use heavy equipment to remove the top foot of soil, process the soil through a screen plant, and return the processed soil to the site. This was much more cost-effective than the traditional approach of hand excavating each anomaly (potential abandoned ordnance).

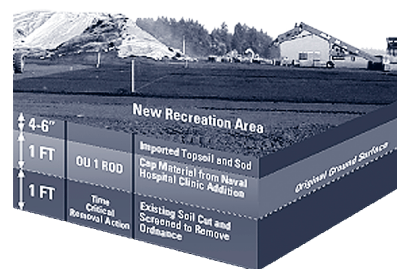
The integration of three separate actions into the same timeframe ensured cost-effective and timely completion of the project. Work crews were able to perform activities for both the ROD and TCRA in the same areas, and prepare a subgrade suitable for recreation features (e.g., bike path, sports courts and a roadway) at the same time.

During the military construction (MILCON) hospital expansion project, approximately 25,000 cubic yards of material was excavated from the construction site. EFA Northwest sampled the material and re-used it in the construction of the vegetated

soil cover, as an alternative to disposing of the material. The re-use of this soil saved approximately \$1.5 million in disposal and imported material costs.

Lessons Learned

Development and refinement of the final design and work plan required the additional analysis and review of several designs, which ultimately ended up avoiding hundreds of thousands of dollars in potential rework. For example, additional graphic analysis of historic aerial



Cross-section of actions.

photographs changed the interpretation of the net shore drift vectors, and led to new insights concerning historical fill areas, particularly the extent of fill at Elwood Point. Review of the performance of the log revetments at another site indicated that, while the revetments could be effective for short-term protection of the developing biogeogrids, they would not be effective as a permanent solution. The revetments were subsequently removed from the Jackson Park design.

• From the Field •

• COST AVOIDANCE •

Corrective Action Management Unit (CAMU) Avoids Cost, Reduces Liability, and Saves Time

Marine Corps Base Camp Pendleton, California

Site Background

MCB Camp Pendleton was established in 1942 to provide training facilities and support to the Fleet Marine Force Units. The base supports a daily population of about 60,000 people, and occupies approximately 125,000 acres along the Pacific Ocean mid-way between San Diego and Los Angeles, CA. DON avoided costs, facilitated cleanup, increased the amount of land available for use, and reduced liability by designating Site 7 of Marine Corps Base (MCB) Camp Pendleton's IR Program a Corrective Action Management Unit (CAMU).

Site 7, also known as Box Canyon Landfill, comprises approximately 32 acres in the southwest portion of MCB Camp Pendleton. Site 7 was designated a CAMU in 1996 to consolidate remediation wastes on base as an alternative to transporting them off base to a private disposal facility. Wastes generated from two non-time-critical removal actions are stored at Site 7, and contamination from these sites includes: pesticides; polychlorinated biphenyls (PCBs); polycyclic aromatic

hydrocarbons (PAHs); and heavy metals. A housing area and an elementary school border the landfill.

Site 7 is now undergoing the closure process. An evapotranspiration (ET) landfill cover has been installed that prevents water infiltration by allowing vegetation to utilize moisture instead of allowing it to percolate through to the waste. DON completed the Site 7 cap in April 2002, and planting vegetation and some peripheral work is still in-progress.

Agency Participation

A Federal Facilities Agreement (FFA) was put in place for MCB Camp Pendleton's IR Program. Parties to the FFA include the U.S. EPA, the California Department of Toxic Substances Control (DTSC), the California Regional Water Quality Control Board (RWQCB), and the Navy and Marine Corps. The FFA Team was intimately involved in the decision-making and planning process for Site 7, as well as the sites placed in the CAMU. Since the landfill contained no bottom liner,

leachate collection system, or gas collection system, the regulatory agencies and the DON teamed effectively to address these crucial problems.

Major issues discussed and agreed upon by the FFA Team include:

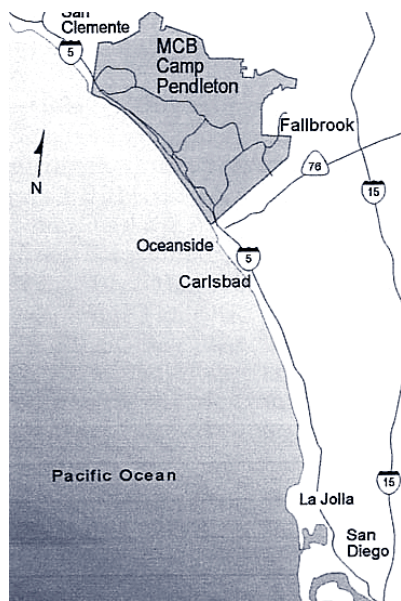
- Type of cover for the landfill;
- Need for landfill gas monitoring;
- Placement of landfill gas monitoring probes;
- Location of groundwater and site geology; and
- Protection of the nearby residents and elementary school during construction.

Community Participation

The surrounding community is considered supportive of MCB Camp Pendleton. The MCB is one of the largest employers in the area, and the community demonstrates intense interest and pride in the base. DON's Technical Review Committee (TRC) comprises many government agencies and community groups and, as needed, holds open meetings for the public. DON focused on community partnering in order to

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Camp Pendleton area map.

ease neighborhood concerns over activities at Box Canyon Landfill. Two public open houses were held (April 2000 and May 2001), and fact sheets were distributed to the public in 2001. In addition, interviews were held between June 2000 and February 2001 with various parties, including individuals from the base, public office, education, business, and local community groups. As a

result of these outreach efforts, the DON issued a new Community Relations Plan in January 2002.

In response to community input and DON's concern for the housing area and school, special precautions were taken during CAMU operations to control dust and cover construction. DON placed noise and air monitors at frequent intervals along the landfill's perimeter to allow for effective monitoring of potential construction impacts. Construction hours were limited in an effort to avoid disturbing the residents and school children. Additionally, gas probes were installed at frequent intervals along the landfill perimeter to measure and monitor methane levels.

Cost avoidance

Approximately 282,000 cubic yards of soil was remediated at the Site 7 CAMU, resulting in over \$25 million in cost avoidance. Transportation costs for transferring large volumes of soil off base to private disposal areas would have been extremely high and potentially cost-prohibitive.

The Environmental Restoration, Navy (ER,N) account did not have sufficient financial resources to fund the cleanup of Site 7 at the original cost. The designation of the Site 7 CAMU ensured that the six areas comprising Site 7 were cleaned up. The CAMU also allowed the base to use over ten-acres of land that would have otherwise been encumbered by contamination and restricted from further use or development.

Additionally, the designation of the on-base CAMU decreased MCB Camp Pendleton's exposure to liability. Disposal of contaminated wastes off base would have required the use of several different Class I landfills, resulting in MCB Camp Pendleton becoming a potentially responsible party (PRP) to those landfills.

The CAMU within the borders of MCB Camp Pendleton remains under government control, and MCB Camp Pendleton has avoided bearing the liability of paying for cleanup of several different private landfills.



Site 7 CAMU in August 2000.

• *From the Field* •

• INNOVATIVE APPROACH/COST AVOIDANCE •

Innovative Approaches to Data Reporting Expedite Property Transfer

Naval Air Station Cecil Field, Florida

Project Summary

Naval Air Station (NAS) Cecil Field was closed under BRAC on 30 September 1999, and is in the process of being transferred to the public sector. As a result, the Navy is conducting environmental investigations, and site close-out under the BRAC, IR, and Underground Storage Tank (UST) Programs.

The BRAC Cleanup Team (BCT) has faced various challenges to complete the task of transferring ownership of the property as a result of base closure. The number of sites being investigated and the various levels of reporting required for each site requires the BCT to review, approve, and manage many documents. The Navy has taken steps to expedite the data evaluation, presentation, and management processes with the ultimate goal of expediting the transfer of property to the community. Approximately 96% of the 17,225-acres of NAS Cecil Field have been transferred to date. The partnering relationship of the BCT is a key factor in achieving these clean-up and property transfer successes.

Remediation

Initially, the Navy conducted investigations of sites with soil contamination by delineating contamination to concentrations below Florida's Soil Cleanup Target Levels (SCTLs), and subsequently removing the contaminated soil. Although this approach would achieve the remedial goal, more soil than necessary would be removed in an effort to attain protection of human health and the environment.

An alternative method using risk assessment and statistical analysis of site data was proposed, and accepted, to better determine the amount of soil removal that would be necessary to achieve protection of human health and the environment. The exposure concentration for a potential receptor within a site was defined as the 95 percent upper confidence limit (UCL) of the mean. If the UCL was determined to be less than the SCTL, then the remedial goal was attained. In instances where the UCLs for contaminants exceeded the SCTL, a statistical approach was used to determine a minimum



Aerial view of Cecil Field.

concentration in soil that should be removed to attain the SCTL. Clean fill would replace the contaminated soil that was removed and the UCL was re-calculated. If the UCL was less than the SCTL, then the remedial goal was attained.

Sites with groundwater contamination undergoing Long-Term

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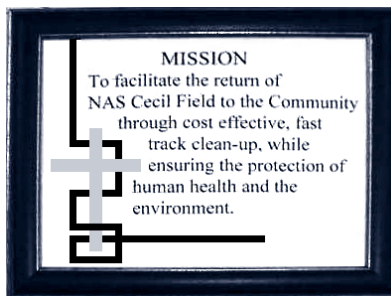
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Monitoring (LTM) required a different approach to data evaluation. Groundwater monitoring is being conducted either on a quarterly, semi-annual, or annual basis at 10 sites.

Data Reporting

The process of reporting the data collected during the groundwater monitoring efforts has evolved over the last several years. In an effort to present the data quickly and effectively to the BCT, the concept of groundwater presentation updates was conceived. Typically, preparing groundwater-monitoring reports requires approximately 28 days from submission of the samples to the laboratory, to receipt of the data, and an additional 35 days to prepare the report. For the annual reports, the BCT would provide comments over a 30-day period, and an additional 15 days would be required to respond to comments and prepare the final submission. This process took several months to accomplish, and often the next round of groundwater sampling was being conducted before the final document was submitted.

To expedite this process, an innovative approach was developed which involved preparing a concise and straightforward presentation once the analytical results were available electronically from the laboratory, via the Internet. The data are generally available in 10 to 20 days from the date of sampling, and



the presentation can be prepared and presented to the BCT within three to four weeks from the time the data was collected. The presentation is provided to the team members prior to the BCT meeting and includes the major components of the typical report in summary format using un-validated data downloaded directly from the lab web site. The validation process and data management procedures are followed, as before. However, the presentation is not delayed by waiting for these processes to be conducted.

Document Management

The extensive amount of data and reports associated with investigations of the property to be transferred quickly became overwhelming. Therefore, the BCT decided that a method to quickly access and retrieve documents was necessary. The Document Management System (DMS) is a web-enabled system that allows secure access to all documents generated, including the LTM presentations, and organizes and indexes the documents in several

ways (e.g., by Building Number, Operable Unit, Site, etc.). The DMS currently manages documents generated over the past 20 years, is updated on a monthly basis, and has proved to be an effective tool for the BCT, allowing them to post, search, and access new and/or historic documents.

Cost Avoidance Measures

Overall, utilizing the 95 percent UCL approach to remediate soil-contaminated sites has resulted in a 69 percent reduction in the amount of soil that would have been removed, and has resulted in an estimated cost avoidance of \$2.5 million.

Cost avoidance associated with the LTM Presentations are realized in terms of time saved during the review process, allowing quick approval of wells eliminated from sampling program, reduced analysis, and less report preparation. Anticipated cost avoidance includes approximately \$105,000 in labor costs and \$54,000 in sampling program reductions over a three-year period.

Innovative processes that include risk- and statistical-based delineation of soil, more rapid presentation and decisions regarding the LTM groundwater program, and the easily accessed and manipulated DMS tool accelerated the clean-up process of NAS Cecil Field, thus returning property to the community more quickly and efficiently.

• *From the Field* •

• INNOVATIVE TECHNOLOGY •

Innovative Technologies Enhance Site Investigation

Naval Weapons Station Charleston, South Carolina

Project Summary

Several innovative technologies were recently applied at the Naval Weapons Station (NWS) Charleston that enhanced the ability of the project team to evaluate the extent and fate of contamination at a chlorinated solvent site. The innovative technologies provided detailed site information at a lower cost than traditional investigation techniques.

The area of concern, SWMU 12, is located near Building 88. The building was used for treatment of wooden ammunition boxes and other operations involving chlorinated solvents. A 500-gallon underground storage tank used for waste collection was located just outside the building. After the contents of the tank were pumped out, the tank was removed and inspected. Evidence of leaks in the storage tank was found, which would have allowed the tank contents to enter the groundwater.

Chlorinated solvents in groundwater at high concentrations have the potential to form a dense non-aqueous phase liquid (DNAPL).



Sap meters.

These dense liquids are difficult to remediate due to their tendency to form a separate phase that sinks in groundwater. To prevent further migration of DNAPLs below the surface, non-invasive techniques are the preferred method for detecting a DNAPL. At the NWS Charleston site, seismic refraction with amplitude variation offset (AVO) was used to detect potential zones of DNAPL in the areas affected by the solvent

release. This technique is capable of identifying anomalies associated with differences in properties of the fluids below the ground surface that might indicate the presence of DNAPL. The results of the geophysical technique indicated that a zone of contamination exists with properties indicative of a DNAPL present at the edge of Building 88.

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MIP data collection.

To determine if the groundwater distribution of contamination down-gradient in a lowland forest, tree cores were taken to map out the extent of the plume. When tree roots are located in groundwater that contains dissolved materials, the compounds are extracted with the water into the root system, and are transported through the tree. The tree can then be cored, removing a small amount of the trunk, and placed into a vial. The vial is then sampled for possible contaminants. A positive detect will indicate that the compounds have migrated to the tree's location. A map of positive detects was then generated to illustrate the general extent of the plume. Sap meters were also used to determine the seasonal transpiration rate of the trees and its influence on the attenuation of the contamination. Results indicated that there is a considerable impact on the movement of the groundwater plume throughout the year that plays a prominent role in preventing the contamination from appreciable migration to the nearby marsh.

Further analysis of the groundwater plume was conducted using the Membrane Interface Probe (MIP) technology. The MIP probe contains soil conductivity, and chemical detectors that provide continuous geological and chemical data as a function of depth in real time. A

probe containing the detectors is pushed into the ground with a mobile rig. When a hot spot is detected, that location is sampled with another probe that collects the groundwater for laboratory analysis. The MIP is a more efficient method of sampling than traditional techniques because samples are taken only at locations that provide beneficial information to the project team.

From these techniques it was determined that the groundwater plume had migrated toward the marshes located to the east of the site. The tall grass marshes provide an effective method of natural attenuation of the chlorinated compounds present. To further analyze the natural attenuation capacity of the marsh, vapor diffusion samplers were placed in the wetland areas. The vapor diffusion samplers measure the gases from volatile compounds in the groundwater as it passes to the surface.

Regulatory Involvement

Members of the partnering team include representatives from the installation, Southern Division NAVFAC, and the South Carolina Department of Health and Environmental Control. Members have been presented with the data collected using these technologies and have recommended their use at other sites.

Cost Avoidance Measures

These techniques allowed for cost effective, timely, and more precise information over some of the traditional techniques of groundwater monitoring, well sampling, and geologic cores. As a result of the work, significant insight into the source and movement of contaminants was obtained. Additionally, cost effective remedies for the cleanup of the site were identified from the site investigation. Phytoremediation and Monitored Natural Attenuation (MNA) have been identified as part of the remedy at this site.

Lessons Learned

The MIP technology was effective in identifying high concentrations, or hot zones, at levels of 1 part per million (ppm) or higher. If concentrations of less than 1 ppm are expected, there is less confidence that a positive detection would be seen.

• From the Field •

• PROPERTY TRANSFER/COST AVOIDANCE •

Government-Owned, Contractor-Operated Facility Divested

Naval Weapons Industrial Reserve Plant St. Louis, Missouri

Project Summary

The Naval Weapons Industrial Reserve Plant (NWIRP) St. Louis, Missouri project team successfully completed the sale of the NWIRP St. Louis facility, a government-owned contractor-operated (GOCO) facility, to the McDonnell Douglas Corporation (MDC) for \$5.22 million. As a condition of the sale, the government and MDC agreed to share all associated environmental remediation costs on a 60/40 basis. The Navy coordinated with MDC in applying a number of environmental remediation techniques that led to a

total cost avoidance of \$1.41 million for both the Navy and MDC. All associated Navy environmental restoration costs were funded by the appreciated plant value of NWIRP St. Louis, resulting in an additional cost avoidance of \$3.8 million of Navy environmental restoration (ER,N) funds. In addition, the sale of the NWIRP St. Louis facility to MDC indemnified the government of all future environmental costs for contaminants, either known or unknown, at the time of the sale.

The facilities that NWIRP St. Louis is comprised of have contributed to the

successful production of several well-known aircraft (e.g., FH-1 Phantom, F-101 Voodoo, F-18 Hornet, etc.). In addition, the Mercury and Gemini manned space capsules and Skylab were also supported by NWIRP facility.

The Curtiss-Wright Aeroplane & Motor Company operated an aircraft manufacturing plant near Lambert Field during World War II. Curtiss-Wright abandoned the factory near the end of WWII, and soon after, the McDonnell Aircraft Corporation (MAC) moved in to the abandoned facilities. MAC became a pioneer in the production of jet-propelled military aircraft and enjoyed considerable success during the post WWII era. MAC eventually purchased most of the available land and facilities in the immediate area, but the government retained ownership of a 45-acre tract of land.

Community Involvement

The NWIRP St. Louis project team included individuals from Naval Air Systems Command (NAVAIR), Southern Division Naval Facilities Engineering Command (SOUTHDIV),



NWIRP St. Louis Building 22, west side.

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General Services Administration (GSA), MDC, Missouri Department of Natural Resources (MDNR), US Congress (Committee on Government Reform), as well as several contractors. Successful teaming between the Navy, MDR, and MDC was essential for ensuring environmental compliance and complete remediation. Prior to the transfer of NWIRP St. Louis to MDC, MDNR had to review and approve MDC's remediation plan.

Additionally, project schedule, plans, and specifications were provided to MDNR in an effort to keep them informed on the progress of the project. Prior MDNR approval of the remediation plan enabled MDC to continue remediation efforts without undue delays caused by the transfer of the facility. As a result, the MDC environmental department maintains a good working relationship with the local community, and the state and federal regulators.

Challenges

The contractual and environmental requirements for government divestiture are daunting and require an in-depth understanding of existing laws and environmental regulations. Provisions of 40 U.S. Code (USC), Section 484 (e)(3)(G), allow the GSA to negotiate the sale of GOCO property to an operating contractor without competition. CERCLA, Section 107 (a), which defines Potentially Responsible Party (PRP) liability, includes operators of GOCOs.



The NWIRP St. Louis Project Team.

Accomplishments

Report of Excess: The land, facilities, and all government-owned equipment inside the plant had to be identified, verified, and appraised. Once this was completed, the Title X Report of Excess was submitted to Congress.

Environmental Investigations: An Environmental Baseline Survey (EBS) was conducted to assess potential effects on human health and the environment resulting from the use, release, disposal, and/or migration of hazardous substances and petroleum products.

National Environmental Policy Act (NEPA): NEPA assures that transferred property will have similar use that will not adversely impact the environment or risk human health and safety.

Cultural and Historical Documentation: At NWIRP St. Louis, historical significance was established as a portion of the entire defense oriented industrial complex presently owned and operated by MDC.

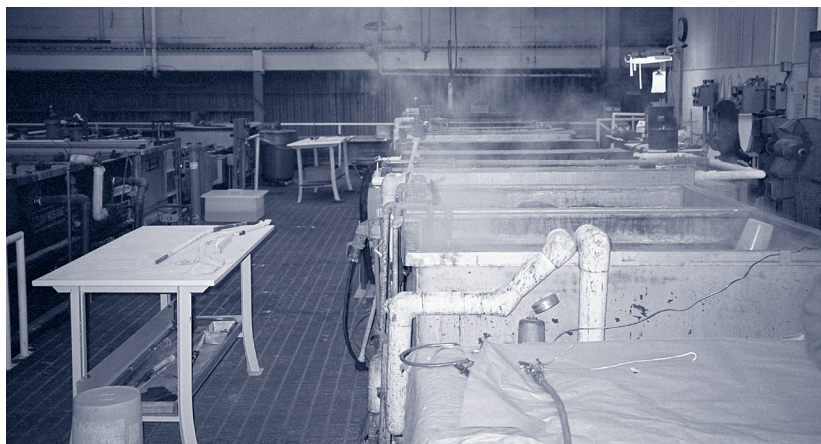
Transfer: The project team worked very closely with the GSA, which is authorized by Congress to dispose of, or sell, government property. Congressman Tom Davis, Chairman of the Subcommittee on Technology and Procurement Policy, approved the sale of this property on 2 July 2001 at which time the property deed was turned over to MDC.

Cost Avoidance Measures

The total NWIRP St. Louis property value was negotiated to be \$8.5 million. This value was almost

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Plating shop tanks.

entirely attributable to the appreciation of the property's fair market value over the past 60 years. SOUTHDIV performed an independent analysis of the MDC remediation plan and cost estimate and identified a more effective innovative technology that would also reduce remediation costs. SOUTHDIV coordinated with MDC to develop a proposal and implement the alternative technology. This effort resulted in a cost avoidance of

\$1.41 million when compared to the cost of the initial remediation plan. In addition, the government agreed to share the cost of remediation and deducted their share of the remediation costs from the property sales price (60 percent of the total remediation cost) estimate in exchange for environmental indemnification. This approach led to a cost avoidance of \$3.8 million of ER,N funds when compared to the costs of the original approach.

Project Success

The transfer of the NWIRP St. Louis property proved to be a successful and effective means of government divestiture. The government was able to avoid the use of appropriated funds for site cleanup by sharing remediation costs with the buyer, and deducting their share of costs from the selling price. This enabled the government to more effectively utilize limited financial resources and expend unused ER,N funds on other critical missions and activities.

This transaction was a noted success for the government in that it called for the buyer to pay for their share of the remediation costs up front, and permitted the government to offset their share of remediation expenses by adjusting the selling price while also indemnifying the government from any future remediation costs associated with the NWIRP St. Louis facility.

